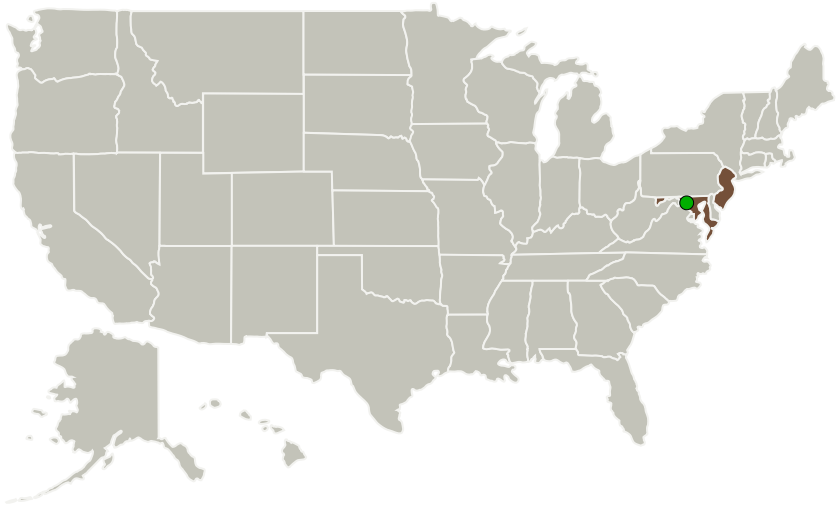
The First JFET-Based Silicon Carbide Active Pixel Sensor UV Imager, Phase II

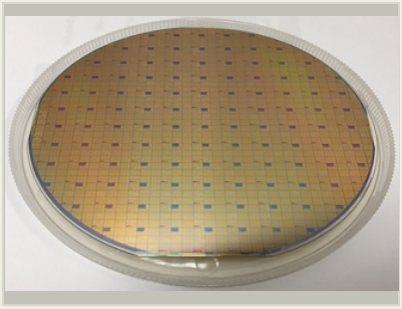
Completed Technology Project (2014 - 2018)

Project Introduction

Solar-blind ultraviolet (UV) imaging is needed in the fields of astronomy, national defense, and bio-chemistry. United Silicon Carbide, Inc. proposes to develop a monolithic, solar-blind UV image sensor with 320 x 256 pixels on a 25 micron pitch with a frame rate of 50 frames per second and pixel fill factor over 80%. A silicon carbide (SiC) integrated circuit technology that is compatible with production in commercial silicon fabs will be used to fabricate the sensors. SiC is an ideal choice because of 1) its material properties that lead to high UV quantum efficiency while being inherently insensitive to visible and near IR light, negligible dark current up to high temperatures, and excellent radiation tolerance and 2) technological maturity demonstrated by commercially available 4-inch wafers and previous demonstrations of SiC integrated circuits by NASA, United Silicon Carbide Inc. and others. Monolithic integration improves sensor reliability and performance over hybrid approaches and the manufacturability of the n-channel JFET fabrication process provides a clear path to commercializing the technology. In addition to producing monolithic solar-blind UV sensors, the underlying SiC integrated circuit technology being developed has numerous harsh environment analog sensing and electronics applications.

Primary U.S. Work Locations and Key Partners





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Organizations Performing Work	Role	Type	Location
United Silicon Carbide, Inc.	Lead Organization	Industry	Monmouth Junction, New Jersey
Goddard Space Flight Center(GSFC)	Supporting Organization	NASA Center	Greenbelt, Maryland

Primary U.S. Work Locations	
Maryland	New Jersey

Project Transitions

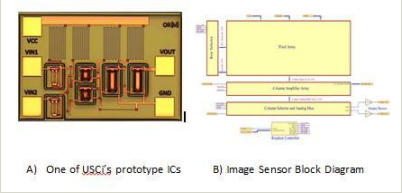
April 2014: Project Start

July 2018: Closed out

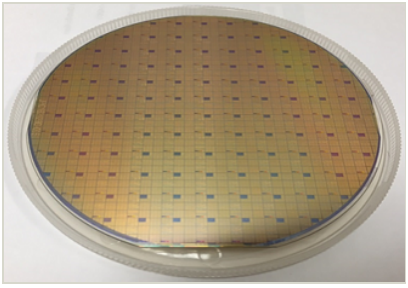
Closeout Documentation:

- Final Summary Chart*(https://techport.nasa.gov/file/140714)*

Images



Briefing Chart Image
The First JFET-Based Silicon Carbide Active Pixel Sensor UV Imager, Phase II
(https://techport.nasa.gov/image/126788)



Final Summary Chart Image
The First JFET-Based Silicon Carbide Active Pixel Sensor UV Imager, Phase II
(https://techport.nasa.gov/image/136224)

Organizational Responsibility

Responsible Mission Directorate:
Space Technology Mission Directorate (STMD)

Lead Organization:
United Silicon Carbide, Inc.

Responsible Program:
Small Business Innovation Research/Small Business Tech Transfer

Project Management

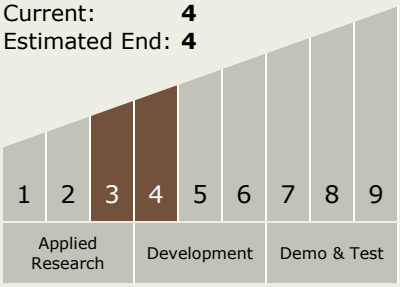
Program Director:
Jason L Kessler

Program Manager:
Carlos Torrez

Principal Investigator:
Peter G Alexandrov

Technology Maturity (TRL)

Start: **3**
Current: **4**
Estimated End: **4**



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Completed Technology Project (2014 - 2018)

Technology Areas

Primary:

- TX08 Sensors and Instruments
  - TX08.3 In-Situ Instruments and Sensors
    - TX08.3.1 Field and Particle Detectors

Target Destinations

The Sun, Earth, The Moon, Mars, Others Inside the Solar System, Outside the Solar System